County of Yolo

PLANNING AND PUBLIC WORKS DEPARTMENT
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Tour of The

YOLO COUNTY CENTRAL LANDFILL

1999

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Yolo County Central Landfill Fact Sheet May 1999

Owner: Yolo County

Operator: Yolo County Planning and Public Works, Division of Integrated Waste Management

Waste Classification: Class III

Landfill Opened: 1975 **Projected Closure Date:** 2021

Total Disposal Capacity: 15,000,000 tons

Total Waste Buried: 4,400,000 tons

Remaining Capacity: 10,600,000 tons

Total Site Acreage: 724.54 acres

Acreage Permitted for Landfilling: 473 acres

Acres Filled with Waste: 163 acres

Liquid Waste Pond: 1.8 acres

Landfill Funding: The landfill operations are primarily funded through the fees collected for waste disposal. The remaining funding comes from royalties, grants and recycling sales. **No tax dollars go to fund the landfill.**

Closure and Postclosure Costs: $55 million dollars, deposits are required annually by state regulators. These deposits are held in a trust fund which will ensures that all of the funds are available for closure of the landfill.

YOLO COUNTY CENTRAL LANDFILL
FEE SCHEDULE

Waste Type	Waste Load Description	Effective November 15, 1996	Effective September 5, 1997	Effective July 24, 1998
SOLID WASTES	Commercial Loads of Waste (in and out of County)	$36.00 ton	$36.00 ton	$36.00 ton
	Residential Vehicles and Trailers with Loads of Waste 3 Feet or Greater in Height and/or 8 Feet or Greater in Length	$36.00 ton	$36.00 ton	$36.00 ton
	Garbage Can, 60 Gal or Less, Household Waste Only, Maximum 2 Cans/visit		$2.00 each	$2.00 each
	Residential Autos with Loads of Waste	$4.00 each	$5.00 each	$6.00 each
	Residential Mini-pickups and Mini-vans with Loads of Waste less than 3 Feet in Height and less than 8 Feet in Length	$7.00 each	$8.00 each	$10.00 each
	Residential Full-size Pickups, Full-size Vans, and Small Trailers with Loads of Waste less than 3 Feet in Height and less than 8 Feet in Length	$8.00 each	$10.00 each	$12.00 each
BULKY WASTES	Styrofoam or Similiar Low Density Materials	$95.00 ton	$95.00 ton	$175.00 ton
	Pallets, Household Furnishings, Tree Stumps, Etc.	$95.00 ton	$95.00 ton	$95.00 ton
	Household Furnishings Such as Sofas, Mattresses, Large Chairs, Etc. ; (Excludes Appliances)	$5.00 each	$5.00 each	$5.00 each
CLEAN GREEN, WOOD, AND BRUSH WASTES	Loads of Clean Green, Wood, & Brush Waste	$20.00 ton	$23.50 ton	$23.50 ton
	Autos, Mini-pickups, Mini-vans, Full-size Pickups, Full-size Vans, and Trailers with Loads of Clean Green, Wood, & Brush Waste 3 Feet or Greater in Height And/or 8 Feet or Greater in Length	$20.00 ton	$23.50 ton	$23.50 ton
	Autos with Loads of of Clean Green, Wood, or Brush Waste	$4.00 each	$5.00 each	$5.00 each
	Mini-pickups and Mini-vans with Loads of Clean Green, Wood, or Brush Waste less than 8 Feet in Length	$7.00 each	$8.00 each	$8.00 each
	Full-size Pickups, Full-size Vans, and Small Trailers with Loads of Clean Green, Wood, or Brush Waste less than 3 Feet in Height and less than 8 Feet in Length	$8.00 each	$10.00 each	$10.00 each
APPLIANCES & METAL WASTES	Appliances - Refrigeration Units (Refrigerators, Freezers, Ac Units, Etc.)	$9.00 each	$10.00 each	$15.00 each
	Appliances - Washers	$7.00 each	$7.00 each	$10.00 each
	Appliances - Microwaves, Trash Compactors, Dishwashers, and Furnaces	$5.00 each	$5.00 each	$7.00 each
	Appliances - Other (Water Heaters, Dryers, Ovens, and Others Not Listed Above)	$5.00 each	$5.00 each	$5.00 each
	Clean Metals - 4 Feet or less in Greatest Dimension, Excludes Appliances	$5.00 ton	$5.00 ton	$5.00 ton

GROUNDWATER MANAGEMENT PROGRAM

GROUNDWATER MONITORING NETWORK (see map next page): 42 Wells

EXTRACTION WELL SYSTEM: 16 Wells

CONTAMINATION: In discharge from extraction wells discovered in April 1992 by several chlorinated solvents.

SOIL-BENTONITE SLURRY CUT-OFF WALL: 4000' x 44' x 3'
(long) (deep) (wide)

TREATMENT: Air Stripper

PERMIT: WDR Order No. 98-198

NPDES No. CA 0083119

DESIGN OF AIR STRIPPER:

Design Water Flow:	150 GPM
Delivered Air Flow:	600 ft^3/min
Air to Water Ration:	30:1
Tower Height:	26 feet, 10 foot add-on available
Design Packed Height:	14.5 feet
Actual Packed Height	18 feet
Packed Column Diameter:	36 inches
Tower Material:	Fiberglass Reinforced Plastic (FRP)
Mist Eliminator:	99.3% efficient at 40 μm
Packing Material:	Lantec Lanpacs, 3.5 inch
Blower:	0.5 hp 230VAC, 1°, TEFC
Controls:	Low pressure alarm + automatic shutoff, high water alarm & automatic shutoff, main disconnect

APPROXIMATE CAPITAL COST: $75,000

ANNUAL OPERATION AND MAINTENANCE: $40,000

METHANE GAS RECOVERY FACILITY

Public/Private Partnership between Yolo County and NEO Corporation.

GAS SUPPLY:	Refined landfill gas from Yolo County Central Landfill Natural gas from PG&E

METHANE GAS COLLECTION SYSTEM (see attached map):

Construction:	1988
Wells:	95 wells on WMU 1-6(see map next page)
Collection:	Vacuum at Methane Gas Recovery Facility

LANDFILL GAS CHARACTERISTICS:

Refined:	Removal of moisture through knockout and filtration
Gas Types:	Methane Carbon Dioxide Trace Gases <1%
Current Volume Per Day:	1600 cubic feet per minute (CFM)
Peak Landfill Gas Generation:	1800 cubic feet per minute (CFM)

ENGINES:	5 Caterpillar G399 (water-cooler) @ 600kw each
POWER PRODUCED:	3000 kw
POWER USAGE:	250 kw
NET POWER GENERATION:	2750 kw
HOUSEHOLD EQUIVALENT:	3000 homes

LIQUID WASTE MANAGEMENT

Operated by Yolo County Public Works Staff

SURFACE IMPOUNDMENTS:

Classification:	Class II
Units	Waste Management Unit G has a double composite liner. Liquid is pumped to City of Davis Wastewater Treatment Facility

WASTE VOLUME:

Landfill Leachate	15,000 to 40,000 gallons/day
Septage	15 tons/month (Currently discontinued)
Gas condensate	500 gallons/day

SLUDGE MANAGEMENT:	Class III disposal after waste acceptability criteria have been met

WOOD AND GREEN WASTE RECYCLING CENTER

Public/Private Partnership with Waste Management Collection and Recycling, Inc. of Sacramento.

CURRENT DIVERSION ACTIVITIES:

Urban Wood and Brush:	7,000 TONS PER YEAR
Yard and Green Waste:	15,500 TONS PER YEAR

URBAN WOOD AND BRUSH PROGRAM:

Grinding Cost:	$9.75/ton
Grinding Rate	30 - 35 tons/hour
Product:	Hog-Fuel, Fiberboard Stock, etc.
Delivery:	Woodland Biomass Plant (25 MW)
Sale Price:	$20/ton
Energy Production from 7,000 Tons:	1 Megawatt
Household Equivalent:	1000 Households

ALTERNATIVE DAILY COVER PROGRAM:

Green Waste Tipping Fee:	$23.50/ton
Screening Cost:	$9/ton
Product:	4" or less processed yard and green waste
Delivery:	Current module for alternative daily cover

METAL RECOVERY FACILITY

Operated by Yolo County Public Works. Contract services to CFC Recovery to remove Freon.

Appliances per month:	383 units
Disposal cost per appliance	$5 to $7 per unit
Disposal cost per washer	$10 per unit
Disposal cost per refrigerator	$15 per unit
Clean scrap metal	$5 per ton
Diverted tons per month:	50 tons
Processing:	
Freon and oil removal:	$10 per unit
Revenue:	
Scrap Metal	$0.00
Aluminum	$320
Steel	$17.86
Handling and Processing:	Schnitzer Steel, Rancho Cordova
Market:	Pacific Rim

Comparison
of
Yolo County's Bioreactor Landfilling Practice
versus
Current State Mandated Landfilling Practice

BIOREACTOR LANDFILLING PRACTICE	CURRENT STATE MANDATED LANDFILLING PRACTICE
Add and recirculate liquid in the landfill.	Limit or prevent the infiltration of liquid into landfill ("Dry Tomb" Landfilling).
OBJECTIVE:	**OBJECTIVE:**
Accelerate bacterial activity to increase the rate of stabilization and landfill gas generation.	Minimize infiltration and leachate production.
POSITIVE IMPACTS OF THE NEW PRACTICE:	**NEGATIVE IMPACTS OF CURRENT PRACTICE:**
• Operation of landfill as an active treatment facility for municipal solid waste to reduce the pollution potential of leachate and landfill gas to the environment. • Increase methane generation rate so that the generation of methane is completed within 10 years, making it more economical for energy production. • Extend landfill life. • Reduce landfill closure and post-closure maintenance costs.	• Current "Dry Tomb" landfilling practice lengthens the decomposition process and prolongs the production of high strength leachate and landfill gas. • Methane generation occurs over very long periods, often rendering energy production uneconomical. • Shorter landfill life. • Long-term landfill post-closure maintenance costs and the potential for long-term environmental risks

BASIC FACTS

YOLO COUNTY CENTRAL LANDFILL
BIOREACTOR DEMONSTRATION PROJECT
April 21, 1999

	CONTROL CELL	ENHANCED CELL
CONSTRUCTION		
Foot Print	0.27 Acres	0.27 Acres
Approximate Depth	40 Feet	40 Feet
Construction of Base Liner	1993	1993
Waste Filling of Cells	April to October 1995	April to October 1995
Total Number of Waste Lifts (5 Foot Lifts)	9	9
Total Solid Waste (Only residential and commercial, no bulky waste)	8,737 Tons	8,568 Tons
Amount of Alternative Daily Cover-Green Waste, Placed Between Lifts (Green Waste is typically 18.5% of residential municipal solid waste (Tchobanoglous, 1993))	1,454 Tons (17% of Total)	1,336 Tons (16% of Total)
Average Waste Compaction	1,014 LBS./CU YD	1,027 LBS./CU YD
Total Amount of Shredded Tires Used for Gas Collection Systems	200 Tons (~ 20,000 Tires)	295 Tons (~29,500 Tires)
INSTRUMENTATION		
Temperature Sensors	11 Thermistors	13 Thermistors
Moisture Sensors	15 Gypsum & 4 PVC	25 Gypsum & 12 PVC
Cell Temperature at:		
Bottom of Cell (Level 1)	79°F (26°C)	90°F (32°C)
15' from Bottom (Level 2)	99°F (37°C)	109°F (43°C)
35' from Bottom (Level 3)	99°F (37°C)	104°F (40°C)

YOLO COUNTY BIOREACTOR DEMONSTRATION PROJECT

PROJECT DESCRIPTION

Yolo County Central Landfill is demonstrating a new, unconventional landfill management strategy called "enhanced" landfilling to manage solid waste landfills. The project consists of the construction and operation of two landfill demonstration cells. One cell serves as the control cell while liquids, both water and leachate, are added to the other cell, called the 'enhanced cell'. Liquid is added and recirculated into the enhanced cell to accelerate bacterial activity, increasing the rate of stabilization and landfill gas generation. Each cell has an area of 100 'x 100' with a depth of 40' and is filled with approximately 9000 tons of municipal solid waste. A gas-impermeable membrane covers each cell to contain the landfill gas. Each cell has a horizontal permeable layer of shredded tires to conduct the landfill gas to a collection point as well as two vertical gas collection wells. Both cells are instrumented to monitor relevant parameters and system performance. Enhanced landfilling has the potential to provide reliable energy generation from solid waste as well as significant environmental and solid waste management benefits. The necessary data will be collected through a comprehensive monitoring program to provide guidelines for the implementation of this technology commercially.

PROJECT OBJECTIVE

- To demonstrate substantially accelerated landfill gas generation and biological stabilization while maximizing landfill gas capture.

- To monitor the biological conditions within the landfill cell.

- To estimate the landfill life extension that can be realized through the rapid conversion of landfilled solids to gas and liquid.

- To provide regulatory agencies as well as landfill owner/operators, consultants and others with information that can be used to develop guidelines for the application of this technology.

- To better understand the movement of moisture through landfills.

- To assess the performance characteristics of shredded tires as a medium for the transfer of landfill gas to collection points.